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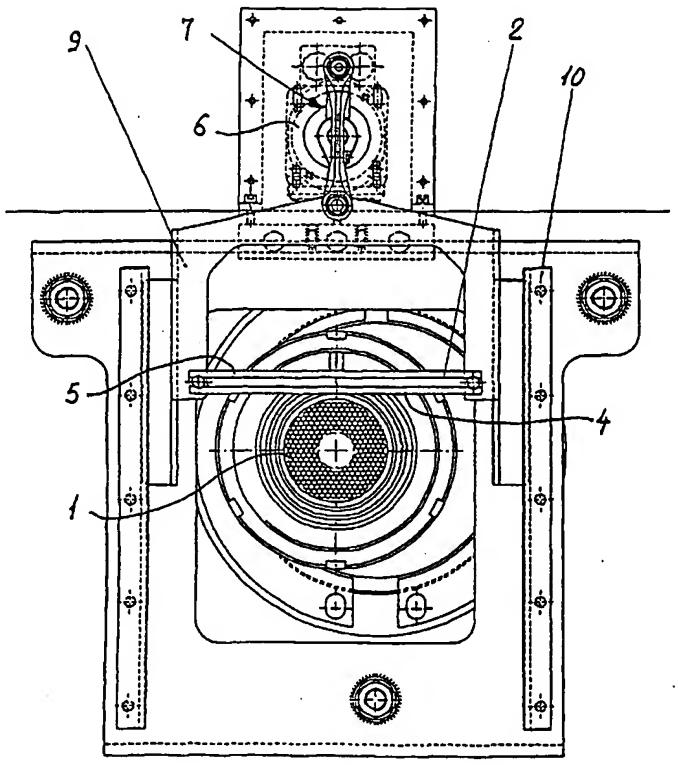
(54) Title: APPARATUS FOR PRODUCING PORTIONS OF MINCED FOODSTUFF FOR PACKAGING IN TRAYS OR THE LIKE



(57) Abstract: In a portioning device for use in connection with as foodstuff-mincing machine producing a continuous product stream of minced foodstuff through a perforated disc, a cutting element is provided for separating the product stream into portions of preselected size. By having a cutting blade (2) mounted to co-operate with the downstream side of the perforated disc (1), a relatively simple construction is provided and advantageously the movement of the cutting blade (2) is performed at a high speed, thereby avoiding the necessity of stopping the flow of product during the cutting operation even at high production rates.

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APPARATUS FOR PRODUCING PORTIONS OF MINCED FOODSTUFF FOR PACKAGING IN TRAYS OR THE LIKE

TECHNICAL FIELD

The present invention relates to a portioning device of the kind set forth in the preamble of claim 1.

BACKGROUND ART

In portioning devices of this kind it is known to convey the minced foodstuff leaving the perforated disc of the mincing machine on a conveyor on which the product is cut up into portions of preselected size by a reciprocating cutting element, possibly co-operating with a flat element located above the conveyor but under the product stream. A portioning device of this kind is e.g. known from EP-1,020,261. GB-2,352,675 discloses a similar portioning device, in which the reciprocating cutting element is positioned between two separate conveyors, the cutting element co-operating with a flat element positioned beneath the product stream. At relatively high production rates it will be necessary to stop the movement of the product stream during the cutting operation in order to avoid accumulation of product in front of the cutting element.

DISCLOSURE OF THE INVENTION

It is the object of the present invention to provide a portioning device of the kind referred to above, in which it is possible to reduce the number of individual components necessary to perform the portioning and to avoid the necessity of stopping the flow of product during the cutting operation even at high production rates, and this object is achieved with a portioning device of said kind, which according to the present invention also comprises the features set forth in the characterizing clause of claim 1. With this arrangement, the cutting element is co-operating with the downstream side of the perforated disc, thus avoiding

supplementary components to co-operate with the cutting element and simplifying the construction taking advantage of the fact that the perforated disc is present anyway. Preferred embodiments, the advantages of which will be evident from the following description of the preferred embodiments, are revealed in the subordinate claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following detailed part of the present description, the invention will be explained in more detail with reference to the exemplary embodiments of a portioning device according to the invention shown in the drawings, in which

Figure 1 shows a foodstuff-mincing machine provided with a portioning device in accordance with the present invention,

Figure 2 shows a cross-section of the machine shown in Figure 1,

Figure 3 shows an embodiment of the portioning device in accordance with the present invention comprising conveyors to provide a gap between the portions, and

Figure 4 shows an alternative embodiment of the portioning device in accordance with the present invention comprising conveyors to provide a gap between the portions.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The apparatus shown in Figures 1 and 2 is a foodstuff-mincing machine provided with a portioning device in accordance with the present invention. The foodstuff-mincing machine shown comprises a screw conveyor and a number of rotating knives co-operating with perforated discs functioning in a conventional way, which is not part of the present invention and thus not explained in further detail, producing a continuous product stream of minced foodstuff through the downstream perforated disc 1. In order to cut up this continuous product stream into portions of preselected size, a cutting blade 2 is mounted to co-operate with the downstream side of the perforated disc 1. In the embodiment shown in Figures 1 and 2, the cutting blade 2 comprises a first cutting edge 4 cutting during the downwards movement of the cutting blade along the perforated disc 1 and a second cutting edge 5 functioning

during the upwards movement of the cutting blade 2. The cutting blade 2 is mounted in a frame 9, which is guided in rails 10 during the reciprocating movement of the frame 9. A servomotor 6 is connected to the frame 9 by means of a crank mechanism 7 in such a way that one revolution of the output axle 8 of the servomotor 6 provides a full cycle of reciprocating movement of the frame 9 and thus the cutting blade 2, i.e. moving the cutting blade 2 down and up again. With the construction shown, a separation of the product stream 3 into separate portions is provided both for the downwards movement and the upwards movement of the cutting blade 2 and accordingly, the reciprocating movement is performed with a stop both at the top position and the bottom position of the cutting blade 2, in Figure 2 illustrated by the top position of the cutting blade 2 and the bottom position of the cutting blade 2'.

The servomotor 6 is used in order to provide a fast movement of the cutting blade 2, and in a preferred embodiment the time for passing from the position where the cutting blade 2 intersects the first perforations in the perforated disc 1 and until the cutting blade 2 passes beyond the intersection of the last perforations in the perforated disc 2, is approximately 60 ms. With such a speed of movement, the product stream is substantially unobstructed even at relatively high production rates with a continuous delivery of product stream being possible during the separation process.

In the embodiment shown in Figures 1 and 2, the screw conveyor in the foodstuff-mincing machine is a twin-screw pump having a positive displacement pumping function, whereby a well-defined amount of product is pumped through the system per revolution of the driving motor for the mincing machine. Accordingly, the portioning can be performed in such a way that the servomotor 6 is activated after a certain number of revolutions of the drive motor for the mincing machine, thus providing well-defined portions of equal size, and the size of the portions can be adjusted in accordance with control weighing of produced portions, said control weighing being used to adjust the number of revolutions of the drive motor for the mincing machine for each activation of the servomotor 6.

A cover 14 is provided for protecting personnel against injury from the moving parts of the portioning device and in order to protect the portioning device against dirt from the surroundings.

In the apparatus shown in Figure 3, the portions of product stream 3 are leaving the portioning device on a conveyor 11, on which the portions are positioned closely juxtaposed, which may lead to problems when delivering the portions to trays on a tray conveyor 13. In order to provide a distance between the portions 3 before delivery to the trays on the tray conveyor 13, the first conveyor 11 is delivering the portions to a second conveyor 12 positioned at a slightly lower position for receiving the portions 3 from the first conveyor 11. The two conveyors 11, 12 are controlled to have the same speed of conveyance except for time periods between the time when one portion 3 has lost contact with the first conveyor 11 and the time when the subsequent portion 3 comes into contact with the second conveyor 12. During this time period, the second conveyor 12 is controlled to have a higher speed of conveyance, whereby a gap is provided between the portions 3 on the second conveyor 12. When portioning e.g. minced meat, the cohesion within each portion 3 is not sufficient to enable the traditional way of providing a gap between portions in which two succeeding conveyors are just driven at different speeds. When proceeding as described above, the speed difference is only present during such time periods, when there is no risk of splitting up the individual portions 3. With the portions thus split up with a gap in between, the delivery of the portions 3 into the trays on the tray conveyor 13 can be performed without any problems.

In the apparatus shown in Figure 4, the portions of product stream 3 are leaving the portioning device on a conveyor 14, on which the portions are positioned closely juxtaposed, which may lead to problems when delivering the portions to trays on a tray conveyor. In order to provide a distance between the portions 3 before delivery to the trays on the tray conveyor, the first conveyor 14 is delivering the portions to a second conveyor 15 positioned at the same level as the first conveyor 14. The two conveyors 14, 15 comprises movable rollers at the transition between the two conveyors 14, 15. The movable rollers are moved during a certain time, when the cut between two portions is positioned at the transition between the two conveyors. The conveyance speed of the first conveyor 14 is constant and the conveyance speed of the second conveyor 15 is higher during said time, and at the same time,

the movable rollers are moved to follow the conveyance speed of the first conveyor 14 during said time. In this way a gap is provided between the portions on the second conveyor 15. After said time has elapsed, the speed of the second conveyor 15 is reduced to the same speed as the speed of the first conveyor 14, and the movable rollers are moved back to receive the next cut between the portions 3. Again, this procedure secures that portions are supported by the conveyors 14, 15 during the gap generation without any risk of splitting up the individual portions 3.

Although the invention above has been described with reference to a specific preferred embodiment, it will be evident that many variations may be possible within the scope of the following claims, such modification e.g. comprising other types of foodstuff-mincing machines ending up with a perforated disc, other types of cutting elements, e.g. only comprising one cutting edge, other drive means for the cutting blade, e.g. comprising a continuously rotating cutting blade intersecting the perforations of the perforated disc once per revolution, and naturally directly delivery of the portions 3 to the trays on the tray conveyor 13 without providing a gap between the portions before such delivery.

PATENT CLAIMS

1. Portioning device for use in connection with a foodstuff mincing machine producing a continuous product stream of minced foodstuff through a perforated disc (1), said device comprising a cutting element (2) for separating the product stream (3) into portions of pre-selected size, characterized by said cutting element comprising a cutting blade (2) mounted to co-operate with the downstream side of said perforated disc (1).

2. Portioning device in accordance with claim 1, characterized by said cutting blade (2) being mounted to perform an intermittent reciprocating movement to separate said product stream (3) into portions.

3. Portioning device in accordance with claim 2, characterized by said cutting blade (2) comprising two cutting edges (4, 5) on opposite sides, thereby performing a separation of the product stream (3) in both movement directions, i.e. two separations for each full cycle of reciprocating movement, where the cutting blade (2) is arrested in two separate positions (2, 2') outside the product stream (3).

4. Portioning device in accordance with any of the preceding claims, characterized by the cutting blade (2) having such dimensions and speed of movement that the product stream (3) is substantially unobstructed by the passage of said cutting blade (2) along the surface of the perforated disc (1), thereby allowing continuous delivery of product stream (3) during the separation process.

5. Portioning device in accordance with any of the claims 3 or 4, characterized by the movement of the cutting blade (2) being controlled by means of a servomotor (6) connected to a mechanism (7) for providing the reciprocating movement of the cutting blade (2) in response to the rotation of the servomotor output axle (8).

6. Portioning device in accordance with claim 5, characterized by the mechanism (7) being a crank mechanism.

7. Portioning device in accordance with any of the preceding claims, c h a r a c t e r i z e d by further comprising a first conveyor (11) positioned to receive the cut up portions (3) in closely juxtaposed positions and delivering these portions (3) to a second conveyor (12) at the end of said first conveyor (11), said second conveyor (12) being positioned at a slightly lower position for receiving the portions (3) from the first conveyor (11), said conveyors (11, 12) mainly being controlled to have the same speed of conveyance except for time periods between the time when one portion has lost contact with the first conveyor (11) and the time when the subsequent portion comes into contact with the second conveyor (12), during which time period said second (12) conveyor has a higher speed of conveyance, thereby providing a gap between portions (3) on the second conveyor (12), said gap being established without disturbing the form of each portion (3).

8. Portioning device in accordance with any of the claims 1-6, c h a r a c t e r i z e d by further comprising a first conveyor (14) positioned to receive the cut up portions (3) in closely juxtaposed positions and delivering these portions (3) to a second conveyor (15) at the end of said first conveyor (14), the conveyors (14, 15) being positioned at the same level and comprising movable rollers at the transition between the two conveyors (14, 15), said movable rollers being moved during a certain time, when the cut between two portions is positioned at the transition between the two conveyors, at the conveyance speed of the first conveyor (14), the speed of conveyance of the second conveyor (15) being higher during said time, and the movable rollers being moved back to receive the next cut between portions (3) after said time.

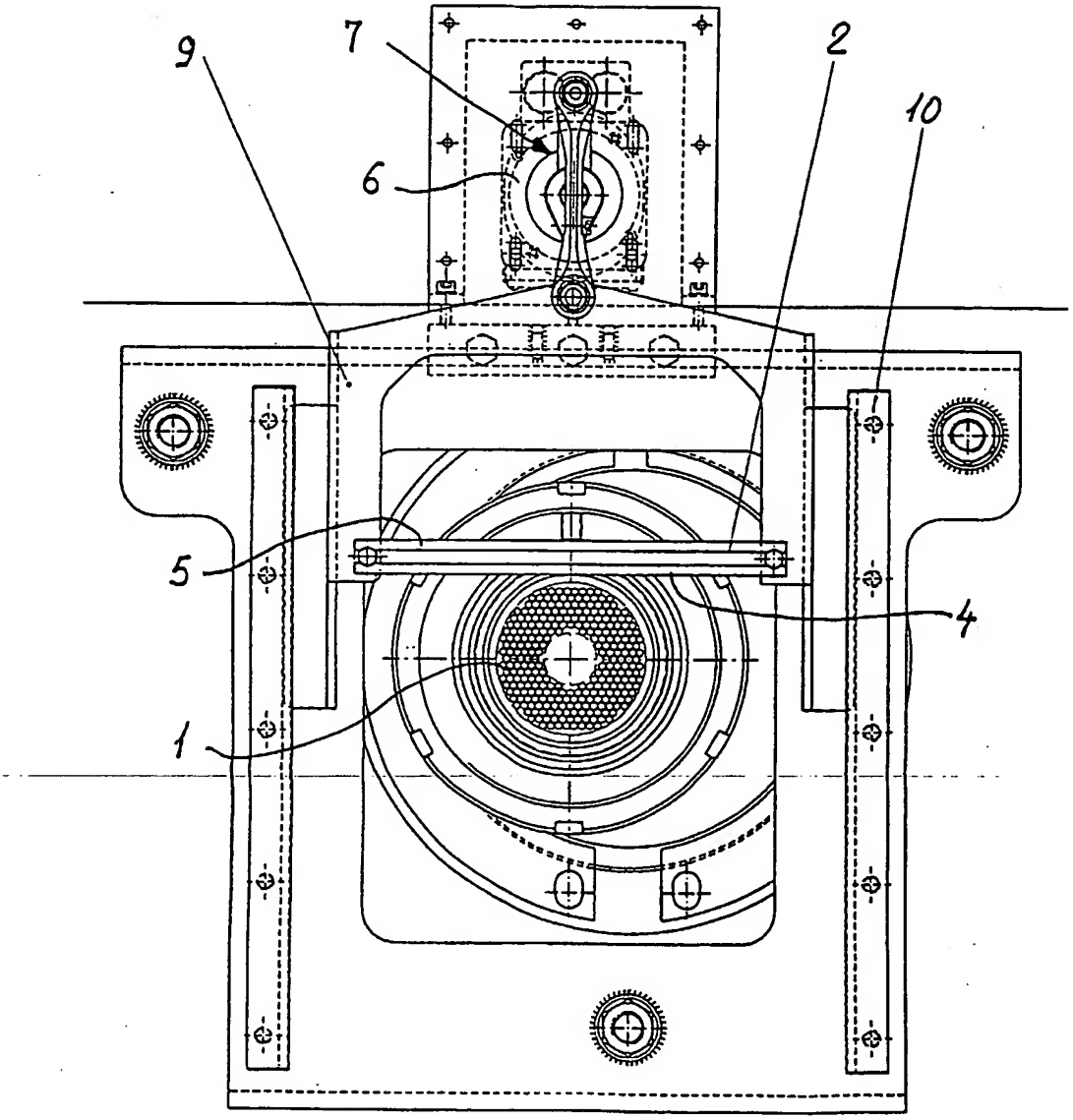

Fig.1.

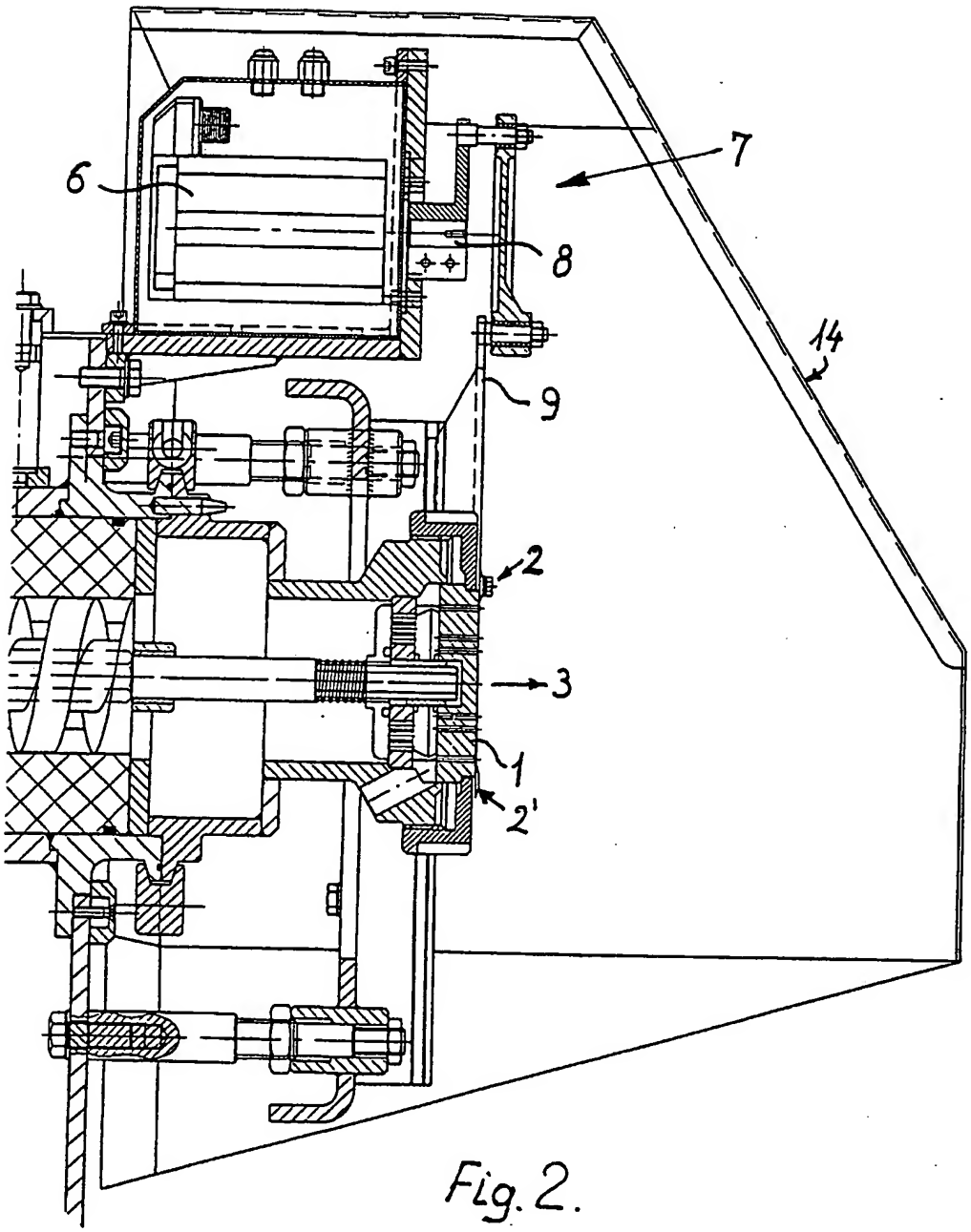

Fig. 2.

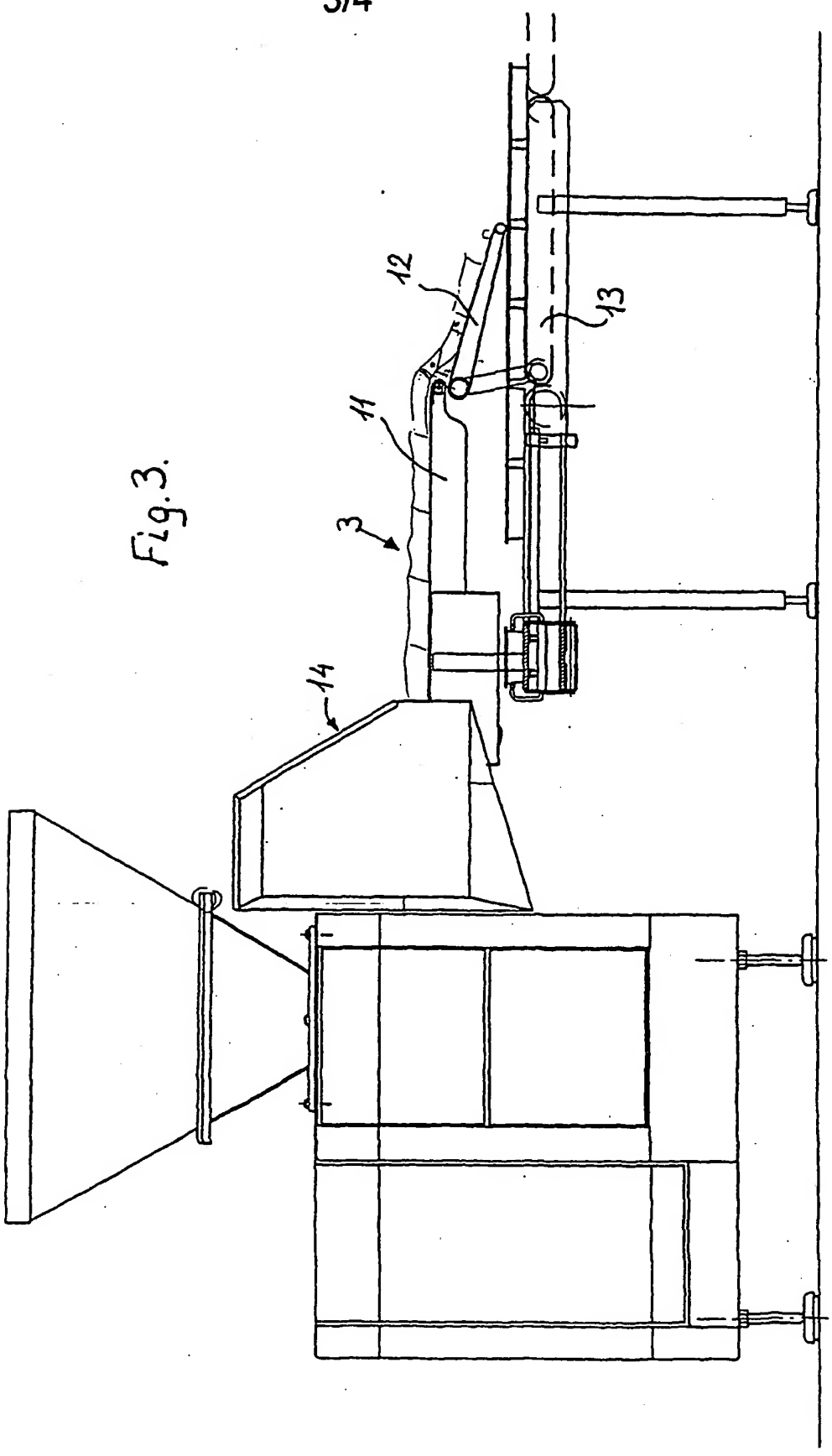

Fig. 3.

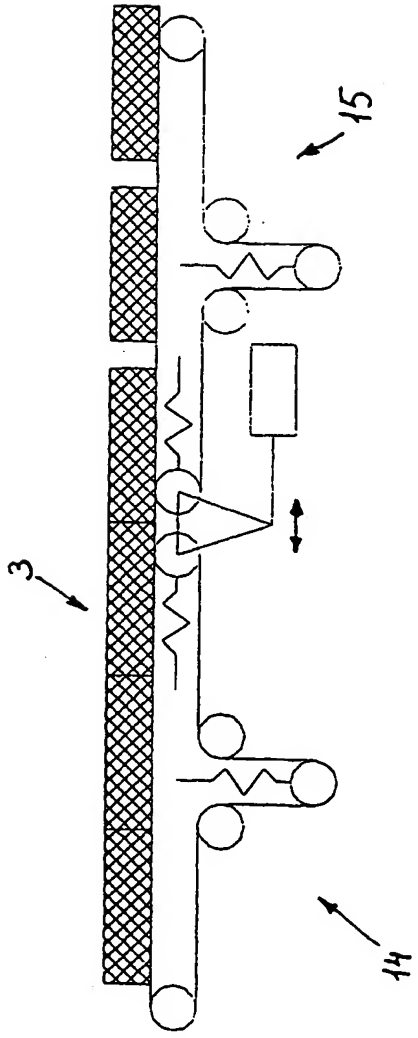

Fig. 4.